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Claims

[c1] 1) A method of producing and assembling a cooling device (15) inside a blade (1) of an axial-flow gas turbine; the blade comprising an airfoil profile (2) having an inner surface (9) defining a chamber (8), and two connecting end portions (6a, 6b) located on opposite sides of said airfoil profile (2) for connection to respective supporting structures forming part of said turbine, and having respective openings (7a, 7b) for the passage of a cooling fluid and which come out inside said chamber (8); the method comprising the steps of forming an insert (16) having a number of holes (22); and positioning said insert (16) inside said chamber (8) so as to face said inner surface (9) and direct a relative stream of said cooling fluid through each said hole (22) on to said inner surface (9); characterized in that said insert (16) is formed by producing a first (17, 18, 20) and at least a second (19) body separate from each other and each of a size approximating but no larger than that of at least one of said openings (7a, 7b); and in that positioning said insert (16) inside said chamber (8) comprises the step of inserting said first (17, 18, 20) and said second (19) body successively through said openings (7a, 7b).

[c2] 2) A method as claimed in Claim 1, characterized in that positioning said insert (16) inside said chamber (8) comprises the further step of fitting said first (17, 18, 20) and said second (19) body resting against each other inside said chamber (8) in a direction (A) crosswise to an insertion axis (5) through said openings (7a, 7b).

[c3] 3) A method as claimed in Claim 2, characterized in that the step of fitting said first (17, 18, 20) and said second (19) body resting against each other is effected by forcing said first body (17, 18, 20) in said direction (A).

[c4] 4) A method as claimed in Claim 3, characterized in that said first body (17, 18, 20) is forced by moving said second body (19) along said insertion axis (5).

[c5] 5) A method as claimed in Claim 3, characterized by comprising the further step of at least axially locking said second body (19) with respect to said airfoil profile (2) after forcing said first body (17, 18, 20).

[c6] 6) A method as claimed in Claim 5, characterized in that said second body (19) is locked by brazing to at least one of said end portions (6a, 6b).

[c7] 7) A method as claimed in Claim 5, characterized in that said second body (19) is locked by interposing a retain-

ing member (43) between said second body (19) and one (6b) of said end portions, and by connecting said retaining member (43) integrally to the end portion (6b).

[c8] 8) A method as claimed in Claim 7, characterized by comprising the further step of forcing said first body (18, 20) inside said chamber (8) in a direction parallel to said insertion axis (5).

[c9] 9) A method as claimed in Claim 8, characterized in that said first body (18, 20) is forced by axially interposing elastic means (48, 49) between said retaining member (43) and said first body (18, 20), and by preloading said elastic means (48, 49).

[c10] 10) A method as claimed in Claim 9, characterized in that said elastic means (48, 49) are preloaded when connecting said retaining member (43) to the relative said end portion (6b).

[c11] 11) A method as claimed in Claim 1, characterized in that said first and said second body (17, 18, 19, 20) are formed with respective inner cavities (24, 25, 28, 34) which communicate with one another after insertion of the bodies inside said chamber (8).

[c12] 12) A method as claimed in Claim 1, characterized by forming said insert (16) to obtain at least a third body

(20), and positioning said second body (19) inside said chamber (8) in an intermediate position between said first (17, 18) and said third (20) body.

[c13] 13) A blade (1) for an axial-flow gas turbine; the blade comprising an airfoil profile (2) having an inner surface (9) defining a chamber (8); two connecting end portions (6a, 6b) located on opposite sides of said airfoil profile (2) for connection to respective structures forming part of said turbine, and having respective openings (7a, 7b) for the passage of a cooling fluid and which come out inside said chamber (8); and a cooling device (15) comprising an insert (16) having a number of holes (22) and positioned inside said chamber (8) so as to face said inner surface (9) and direct a relative stream of said cooling fluid through each said hole (22) on to said inner surface (9); characterized in that said insert (16) comprises a first and at least a second body (17, 18, 19, 20) separate from each other and each of a size approximating but no larger than that of at least one of said openings (7a, 7b), so as to be insertable through the openings (7a, 7b).

[c14] 14) A blade as claimed in Claim 13, characterized in that said first and said second body (17, 18, 19, 20) are fitted resting against each other inside said chamber (8) in a direction (A) crosswise to an insertion axis (5) through

said openings (7a, 7b).

[c15] 15) A blade as claimed in Claim 14, characterized in that said cooling device (15) comprises first forcing means (31, 32, 33) for forcing said first body (17, 18, 20) in said direction (A).

[c16] 16) A blade as claimed in Claim 15, characterized in that said first forcing means (31, 32, 33) comprise a wedge connection, between said first (17, 18, 20) and said second (19) body, comprising two mating surfaces (31, 32, 33) sloping with respect to said axis (5).

[c17] 17) A blade as claimed in Claim 15, characterized by comprising locking means (42a, 43) for at least axially locking said second body (19) with respect to said airfoil profile (2).

[c18] 18) A blade as claimed in Claim 17, characterized in that said locking means comprise a brazed joint (42a) connecting said second body (19) to at least one of said end portions (6a, 6b).

[c19] 19) A blade as claimed in Claim 17, characterized in that said locking means comprise a retaining member (43) interposed between said second body (19) and one of said end portions (6b), and connected integrally to the end portion (6b).

[c20] 20) A blade as claimed in Claim 19, characterized in that said cooling device (15) comprises second forcing means (43, 48, 49) for forcing said first body (18, 20) inside said chamber (8) in a direction parallel to said axis (5).

[c21] 21) A blade as claimed in Claim 20, characterized in that said second forcing means (43, 48, 49) comprise preloaded elastic means (48, 49) interposed between said retaining member (43) and said first body (18, 20).

[c22] 22) A blade as claimed in Claim 13, characterized in that said insert (16) comprises at least a third body (20); said second body (19) being interposed between said first (18) and said third (20) body.

[c23] 23) A blade as claimed in Claim 13, characterized in that said end portions are defined by respective pins (6a, 6b) hinged to respective supporting structures of said turbine.

[c24] 24) A blade as claimed in Claim 13, characterized in that said first and said second body (17, 18, 19, 20) define respective inner cavities (24, 25, 28, 34) communicating with each other.